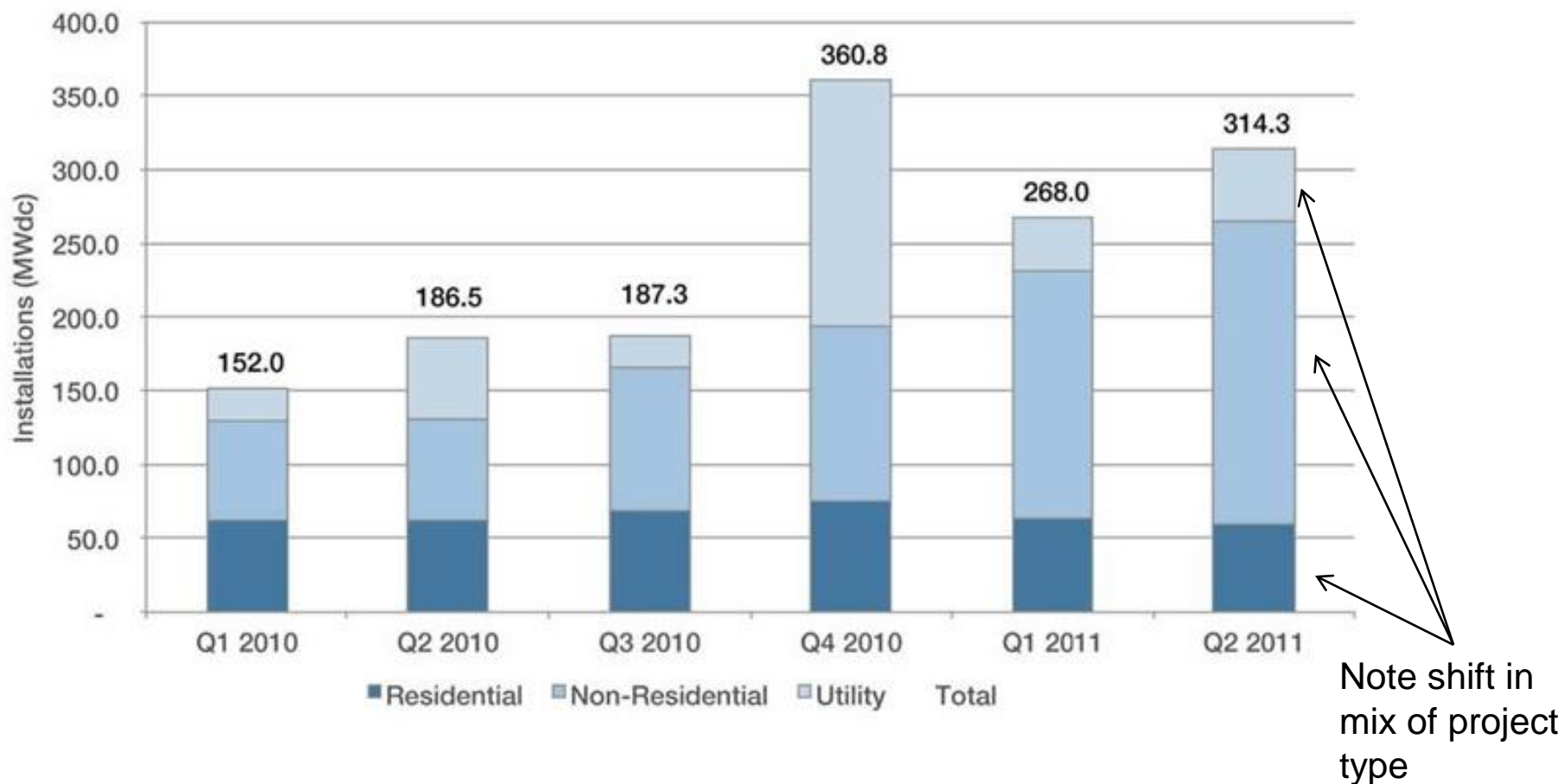


# **Solar market and thoughts on the role of government/private partnership**

*September 29, 2011*

# Solar market – Very strong globally and in US

## U.S. PV Installations, 2010-Q2 2011

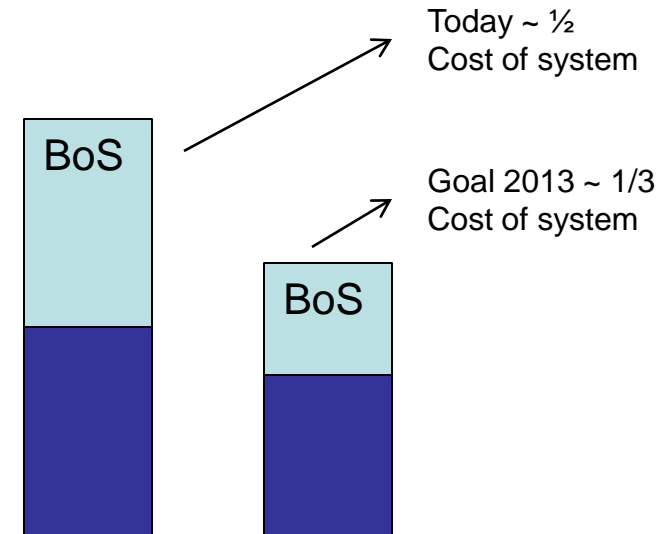


# Solar market – Macro trends

- Lowest cost **kWh** always prevails
- Many global equipment makers have production that is not properly linked to demand → over production
- Most solar equipment is poorly differentiated
  - ADD THESE UP AND RESULT IS PRICE COMPRESSION

# Solar market – Macro trends

- Equipment cost reductions will slow now
- Market will seek ways to take cost out of “balance of system”
  - Installation labor
  - Electrical installation
  - Permitting
  - Racking
  - Structural analysis
  - Misc. and overhead



# Drivers for solar projects in the US

- Generally speaking, four potential cash flows drive a project
  - Federal ITC of 30%
  - Depreciation tax benefit
  - Sale of the kWh generated
  - Additional local incentive for installation

# Drivers for solar projects in the US

- Federal ITC

- In place until end of 2016
- Offered as a cash grant in lieu of credit by the ARRA for 2010, extended to 2011. Treasury 1603 grant program :: Unlikely to extend again
  - Means that a project started in 2011 can claim the 30% in cash rather than as a tax credit
- When 1603 expires, expect projects to “go big”
  - Grant in lieu of tax credit is appealing to smaller entities and homeowners
  - Large entities with significant tax liability won't bother with smaller projects.

# Considerations for rule making

- Investors more and more pushed to larger projects (1603 expiration)
- Rooftop projects are often done in “bundles”, e.g. 20MW spread over a dozen large rooftops.
- Pave way for larger projects :
  - Interconnect limits
  - Flexibility in interconnect requirements

# Why does it matter?

- Levelized Cost of Energy from rooftop solar is dropping like a rock.
- We modeled a 1MW rooftop solar project, installed using tenKsolar and based upon our cost and install projections for 1Q 2013
- We included zero incentives, only the federal ITC and asset depreciation
- 2013 LCOE forecast for a project like that in Minnesota is 0.064 cents/KWH.
- As costs get to that point, solar is here to stay and we need rules to accommodate big projects



# Examples of interconnect streamlining

- Anti-islanding test: Simply verifying that the UL1741 Certified Inverter works
- Required outdoor AC disconnect : too restrictive at some sites
- Requirement that production meter be outdoors : not really in keeping with today's remote metering technology and creates too many restrictions in design
- Phase balancing requirements could be updated to all the DG resource (solar) to be adjusted to meet site specific phase balancing needs